

Listing of Claims

1. An A drop on demand ink jet apparatus for the discrete and registered placement of non-ink chemistry on a substrate, the apparatus comprising:

at least one solenoid valve designed to emit a single droplet of a non-ink chemistry on a substrate during each opening of the solenoid valve, said solenoid valve containing an orifice;

at least one non-ink chemistry source, in communication with said at least one valve, and capable of communicating at least one non-ink chemistry to the at least one solenoid valve; and

a heating element;

wherein the heating element is positioned proximate to at least one chemistry, and wherein the heating element allows the apparatus to process phase-change materials.

2. The apparatus of Claim 1 further comprising a control means adapted to operate said at least one solenoid valve;

wherein said control means is in communication with the at least one solenoid valve.

3. The apparatus of Claim 1, wherein the at least one chemistry source is selected from a reservoir or a continuous feed system.

4. The apparatus of Claim 2, wherein the at least one solenoid valve is controlled so as to discharge the at least one chemistries in a pattern.

5. The apparatus of Claim 1 further comprising a manifold plate and wherein the at least one valve is positioned in the manifold plate.

6. The apparatus of Claim 5, wherein at least one chemistry is passed through the manifold to at least one solenoid valve and is deposited on the substrate to provide topography on the substrate.

7. The apparatus of Claim 1, wherein the apparatus discharges discrete segments of chemistry and provide enhanced fluid handling characteristics or skin separation to the substrate.

8. The apparatus of Claim 7, wherein the discrete segments have a volume of between about 5 nanoliters and about 400 nanoliters.

9. The apparatus of Claim 7, wherein the discrete segments have a length and width less than about 2 mm and greater than about 0.2 mm.

10. The apparatus of Claim 7, wherein said discrete segments are discharged at a frequency between about 1 Hz and about 2 kHz.

11. The apparatus of Claim 1 further comprising a pressure source, wherein the pressure source maintains adequate pressure in the apparatus so as to assist in the regulation of the chemistry discharge from the at least one orifice.

12. The apparatus of Claim 1 further comprising a temperature sensor, wherein the temperature sensor measures the temperature of the at least one chemistry in the apparatus.

13. The apparatus of Claim 1, wherein the control means is capable of operation in multiple modes.

14. The apparatus of Claim 1, wherein the apparatus can apply the non-ink chemistry to a substrate so as to create a topography of chemistry and the non-ink chemistry is selected from the group consisting of medicaments, waxes, lotions, ointments, skin health agents and topical applications.

15. A drop on demand printing device for the registered placement of non-ink phase-change liquids comprising:

at least one solenoid valve designed to emit a non-ink chemistry on a substrate during each opening of the solenoid valve, said solenoid valve having a discharge orifice;

a heating element, said element being capable of providing heat to the device so as to allow the utilization of non-ink phase-change liquids;

a non-ink chemistry supply, said supply being in fluid communication with at least one solenoid valve; and

a control means, adapted to operate with the at least one solenoid valve.

16. The device of Claim 15, wherein the chemistry supply is a reservoir or a feed system.

17. The device of Claim 15, wherein the valve projects from the orifice droplets of chemistry, containing, at least in part, one or more phase-change liquids.

18. The device of Claim 15, wherein the valve projects discrete segments of droplets of chemistry, containing, at least in part, one or more phase-change liquids.

19. A method of placing one or more non-ink chemistries in a discrete and registered fashion, said method comprising:

providing a valve jet, said jet comprising: at least one solenoid valve, said valve containing an orifice; at least one non-ink chemistry source, said at least one non-ink chemistry source in communication with said at least one valve, and said at least one non-ink chemistry source is capable of communicating at least one non-ink chemistry to at least one solenoid valve; and a heating element; wherein the heating element is positioned proximate to at least one non-ink chemistry, and wherein the heating element allows the apparatus to process phase-change ~~materials~~ non-ink chemistries;

providing an amount of non-ink chemistry;

communicating the non-ink chemistry from at least one non-ink chemistry source to at least one solenoid valve;

providing heat to at least one non-ink chemistry; and

discharging at least one non-ink chemistry from at least one solenoid valve in a pattern.

20. The method of Claim 19 further comprising:

providing a substrate;

wherein the discharged chemistry forms discrete segments on the substrate.

21. The method of Claim 20, wherein the chemistry is applied in one application to a substrate so as to create a topography of chemistry on the substrate and provide the substrate with enhanced fluid handling characteristics and/or skin separation.

22. The method of Claim 19, wherein the solenoid valves further comprise a discharge orifice.

23. The method of Claim 20, wherein discharging the chemistry from the at least one solenoid valve comprises firing one or more of the at least one valves.

24. The method of Claim 19, further comprising:
regulating the discharge of the chemistry from the at least one solenoid valves;
wherein the valve jet further comprises a control element; wherein the control element is in communication with the at least one solenoid valves; and wherein the control element regulates the solenoid valves such that the chemistry is discharged onto the substrate in a pattern.

25. The method of Claim 24, wherein the control element provides for real-time adjustment of the discharge from the at least one solenoid valve.

26. The method of Claim 20, wherein said discrete segments have a substantially semicircular cross-section extending above the substrate.

27. The method of Claim 19, wherein the at least one chemistry is selected from medicaments, inks, waxes, paints, lotions, ointments, skin health agents, topical applications, ~~or~~ and combinations thereof.

28. The method of Claim 19, wherein at least one chemistry is a phase-change material.

29. The method of Claim 20, wherein the substrate is selected from a film, woven, nonwoven, paper and laminates ~~or~~ and combinations thereof.

30. The method of Claim 20, wherein the discrete segments are applied to the substrate so as to create bond points.

31. The method of Claim 30, wherein the discrete segments bond points are inter-fiber bond points or interfacial bond points.

32. The method of Claim 19, wherein the viscosity of the at least one chemistry discharged from the valve jet is between about 1 centipoise and about 300 centipoise at the time of discharge.

33. The method of Claim 20, wherein the valve jet discharges discrete segments having a volume of between about 5 nanoliters and about 400 nanoliters.
